



**Rocky Flats Environmental Technology Site**

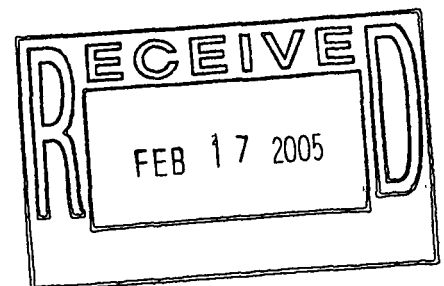
**PRE-DEMOLITION SURVEY REPORT (PDSR)**

**BUILDING B771/774, Exterior**

**REVISION 0**

**March 30, 2004**

**CLASSIFICATION REVIEW NOT REQUIRED PER  
EXEMPTION NUMBER CEX-005-02**



**ADMIN RECORD**

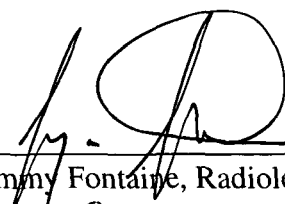
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**PRE-DEMOLITION SURVEY REPORT (PDSR)**

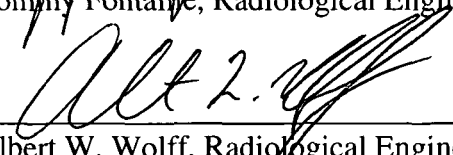
**BUILDING 771/774, Exterior**

**REVISION 0**

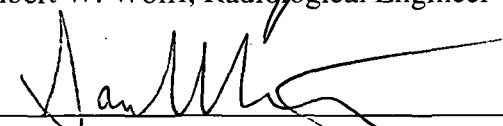
**March 30, 2004**

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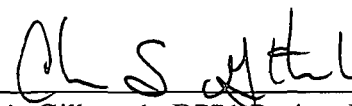
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## ATTACHMENTS

- A Survey Unit Overview Map
- B Survey Unit 771067 Radiological Data Summary and Survey Map
- C Survey Unit 771169 Radiological Data Summary and Survey Map
- D Survey Unit 771071 Radiological Data Summary and Survey Map
- E Data Quality Assessment Details
- F Historical Review

## ABBREVIATIONS/ACRONYMS

ACM	Asbestos Containing Material
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
DCGL <sub>EMC</sub>	Derived Concentration Guideline Level – elevated measurement comparison
DCGL <sub>W</sub>	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
HSAR	Historical Site Assessment Report
HEUN	Highly Enriched Uranyl Nitrate
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
K-H	Kaiser-Hill
LBP	Lead-based paint
LLW	Low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated Biphenyls
PDS	Pre-demolition survey
PDSR	Pre-demolition survey report
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
FFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSA	Removable Surface Activity
RSOP	RFCA Standard Operating Protocol
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Total surface activity

VOCs	Volatile organic compounds
WSRIC	Waste Stream and Residue Identification and Characterization

## EXECUTIVE SUMMARY

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the Building 771/774 Exterior. Because this Type 3 area will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Building surfaces characterized as part of this PDS include the exterior of Buildings 771 and 774.

The PDS encompassed both chemical and radiological characterization. The characterization was built upon physical, chemical and radiological hazards identified in the facility-specific *B771 and B774 Hazards Characterization Report for the 771 Closure Project*.

Based upon the results of this PDSR, the 771/774 Exterior meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan. The Building 771/774 Exterior can be demolished and the waste managed as PCB Bulk Product waste or as sanitary waste, and the concrete can be used for backfill on-site per the RFCA RSOP for Recycling Concrete. To ensure that the facility remains free of contamination and PDS data remain valid, Level 2 isolation controls are established, however, the area will not be posted because personnel do not routinely access these areas.

## 1 INTRODUCTION

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the Building 771/774 Exterior (vertical surfaces). Because this Type 3 building will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). The results of this survey shall demonstrate that the 771/774 Exterior meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan prior to demolition. Building surfaces characterized as part of this PDS include the Exterior of Buildings 771 and 774.

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed. Among these is the Building 771/774 Exterior. This facility no longer supports the RFETS mission and will be removed to reduce Site infrastructure, risks and/or operating costs.

Before this Type 3 facility can be demolished, the Data Quality Objectives (DQOs) for a Pre-Demolition Survey (PDS) must be satisfied; this document presents the PDS results for the Building 771/774 Exterior. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS is built upon physical, chemical and radiological hazards identified in the facility-specific *B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0.

### 1.1 Purpose

The purpose of this report is to communicate and document the results of the Building 771/774 Exterior PDS effort. A PDS is performed prior to building demolition to define the pre-demolition radiological and chemical conditions of a facility. The pre-demolition conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

### 1.2 Scope

This report presents the pre-demolition radiological and chemical conditions of the Building 771/774 Exterior (vertical surfaces) that will be free-released and disposed of as sanitary waste or used as backfill per the requirements of the *RFETS, RFCA RSOP for Recycling Concrete*. The roof of Buildings 771/774 is to be included in a different report. The original Building 774 structure (including Rooms 202, 203, and 210), the Annex walls/roof, and a 380 ft<sup>2</sup> section of the east wall of Room 241 will be packaged and disposed of as radioactive waste. Rooms 102 and 103 of Building 774, which are located six feet below the final proposed grade level, will remain *in-situ* and have been filled with a concrete aggregate. A PDS will not be performed for any of these areas.

All areas that will be packaged and disposed of as radioactive waste will be protected with fixative and verified to have removable levels less than 20 dpm per 100 cm<sup>2</sup> gross alpha. Contamination control measures to be used during demolition include water and fixative for dust suppression. In addition, demolition activities will be ceased when wind speeds

exceed 15 mph. Close-in air sampling shall be used to ensure the safety of the worker and the public.

### 1.3 Data Quality Objectives

The Data Quality Objectives (DQOs) used in designing this PDS were the same DQOs identified in the Section 2.0 of the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to section 2.0 of MAN-127-PDSP for these DQOs.

## 2 HISTORICAL SITE ASSESSMENT

A facility-specific Hazards Characterization Report was conducted to understand the facility history and related hazards. The Building 771 Hazards Characterization was performed in June 2001 (Refer *B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0). Based on the characterization results, radiological contamination was identified in Buildings 771 and 774, and the Building 771/774 was identified as a Type 3 facility. Therefore, a PDS was required before demolition of the facility.

The survey units that encompass most of the 771/774 Exterior (771067, 771069, and 771071) are classified as Class 3 based on their contamination potential, per Section 3.0 of the PDSP. This classification is based on the low contamination potential for the building exterior. The most likely sources of contamination of this area include the 1957 Building 771 fire, the 1969 Building 776 fire, and other miscellaneous airborne emission sources from the site. However, environmental sampling performed to date indicates that the fires did not spread detectable contamination into the surrounding soils. Therefore, contamination would not be expected on structural exteriors.

The original Building 774 structure (including Rooms 202, 203, and 210), the Annex walls/roof, and a 380 ft<sup>2</sup> section of the east wall of Room 241 will be packaged and disposed of as radioactive waste. Rooms 102 and 103 of Building 774, which are located six feet below the final proposed grade level, will remain *in-situ* and have been filled with a concrete aggregate. A PDS will not be performed for any of these areas.

This report documents the results of that PDS. The hazards characterization results and historical review (refer to Attachment F) were used to identify PDS data gaps and needs, and to develop radiological and chemical PDS characterization packages. Characterization documentation is located in the Building 771 Characterization Project files.

## 3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

The Building 771/774 Exterior was characterized for radiological hazards per the PDSP. Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on the facility surfaces. Measurements were performed to evaluate the contaminants of concern (weapons-grade plutonium isotopes). Based upon a review of the characterization data, historical and process knowledge, in-process survey data, building walk-downs, and MARSSIM guidance, a Radiological Characterization Plan was developed during the planning phase that describes the



minimum survey requirements (refer to survey packages 771067, 771069, and 771071). A Survey Unit Overview Map is presented in Attachment A. Based on hazard characterization data and historical and process knowledge, transuranic isotopes are the primary contaminants of concern in Buildings 771/774. Therefore, the PDS was performed to the transuranic PDS unrestricted release criteria. Individual radiological survey unit packages are maintained in the Building 771 Characterization Project files.

The Building 771/774 Exterior survey unit packages was developed in accordance with Radiological Safety Practices (RSP) 16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*. Total surface activity (TSA), removable surface activity (RSA), and media samples were collected in accordance with RSP 16.02 *Radiological Surveys of Surfaces and Structures*. Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, *Radiological Survey/Sample Data Analysis*. Quality control measures were implemented relative to the survey process in accordance with RSP 16.05, *Radiological Survey/Sample Quality Control*. Radiological survey data, statistical analysis results, survey locations, and radiological scan maps are presented in Attachments B, C, and D, *Radiological Data Summary and Survey Maps*.

#### **Building 771 Exterior – (Survey Unit 771067)**

The exterior Building 771 was classified as a Class 3 survey unit. The classification was based on the low potential for contamination. A total of 43 random TSA and RSA measurements, and 3 media samples were collected. Surface scans of 532 m<sup>2</sup> (43% of the total surface area) were also performed.

The Building 771 exterior walls, both below and above grade, are cast-in-place steel-reinforced concrete tied to the footings, columns, floors and roof.

Four media samples were originally taken on the exterior of the 771 building in December, 2002 (at the random TSA/RSA locations that were painted with non-original paint). These samples were analyzed as a batch shot. The result of this measurement exceeded the DCGL<sub>w</sub> of 100 dpm/100cm<sup>2</sup>. Since the exact location of where the contamination came from could not be deduced from the batch shot, each location was re-sampled (on 6/30/03). One sample result exceeded 100 dpm/100 cm<sup>2</sup>. This location was on the grating of the B771 dock, which was routinely used for load-out of radiological laundry garments. Because this area had been repainted on numerous occasions, and because grating cannot be adequately surveyed for alpha contamination (due to geometry constraints), the grating was removed and disposed of as radioactive waste. Because this area was removed from the survey unit, only 3 media sample results are reported.

#### **Building 771 IDEC Exterior – (Survey Unit 771069)**

The exterior surfaces of Building 771 IDEC were classified as a Class 3 survey unit. The classification was based on the low potential for contamination. The IDEC was constructed in 1987 to support a cooling system for B771, which never went on-line. The

IDEC construction consists of a metal outer-wall covering sandwiched over insulation. The facility is steel I-beam construction with a metal roof over roof insulation.

A total of 19 random TSA and RSA measurements, and 3 media samples were collected. Surface scans of 275 m<sup>2</sup> (22% of total area) were also performed.

The three paint samples were collected on December 4, 2002, at the random TSA/RSA locations that were painted with a non-original coating. All results were less than the DCGL<sub>w</sub> of 100 dpm/100cm<sup>2</sup>. In addition, seven coupon samples were collected and analyzed on an alpha spectrometer to verify the presence of Polonium-210 and the absence of plutonium and americium. Polonium-210 was suspected when elevated readings (~ 200 dpm/100 cm<sup>2</sup>) were observed on the galvanized metal (flashing, and metal vent covers) during the scanning effort. Polonium-210 was detected on all seven coupon samples. No plutonium or americium was detected.

One of the seven coupon samples was collected at TSA data point 771069PRP-N002. Because this result was verified analytically to be due to naturally-occurring activity (Po-210), the result was reported as zero.

#### **Building 774 Exterior – (Survey Unit 771071)**

The exterior surfaces of Room 241, 341, and 441 of Building 774 were classified as a Class 3 survey unit. The classification was based on the potential for contamination due to process history. This reinforced concrete structure, known as the “plenum building”, was an add-on to the original Building 774 and was built circa 1972. A small section of the 241 east exterior wall (approximately 380 ft<sup>2</sup>), is contaminated due to its proximity to the process waste underground storage tanks (USTs) and will be packaged and disposed of as radioactive waste. The USTs were previously remediated. The remaining portions of Building 774 will be packaged and disposed of as radioactive waste.

A total of 15 random TSA and RSA measurements, and 3 media samples were collected. Surface scans of 155m<sup>2</sup> (17% of total surface area) were performed.

Three media samples were collected at random TSA/RSA locations that were painted with a non-original coating. A gamma-spectrometry batch shot was performed for the three samples. The result was less than the DCGL<sub>w</sub> of 100 dpm/100cm<sup>2</sup>.

## **4 CHEMICAL CHARACTERIZATION AND HAZARDS**

Based on a thorough review of historical and process knowledge, visual inspections, and personnel interviews, no additional chemical hazard sampling requirements were identified.

### **4.1 Asbestos**

#### **Building 771/774 Exterior**

Asbestos containing building material is not present in/on the building 771 exterior (vertical surfaces).

#### **4.2 Beryllium (Be)**

The exterior of building 771 and 774 is not and has never been a beryllium-controlled area. In addition, there are no potential sources for beryllium contamination on the vertical exterior surfaces.

#### **4.3 RCRA/CERCLA Constituents [including metals and volatile organic compounds (VOCs)]**

There are no RCRA/CERCLA contaminants on the vertical exterior surfaces of Buildings 771/774.

#### **4.4 Polychlorinated Biphenyls (PCBs)**

There are no indications that the Exterior of B771/771 is contaminated with PCBs.

### **5 PHYSICAL HAZARDS**

Physical hazards associated with the B771/774 Exterior are common to standard industrial environments, and include hazards associated with utilities. There are no other unique hazards associated with the facility. The facility has been relatively well maintained and is in good physical condition, therefore, does not present hazards associated with building deterioration.

Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

### **6 DATA QUALITY ASSESSMENT**

Data used in making management decisions for decommissioning of Building 771/774 Exterior, and consequent waste management, is of adequate quality to support the decisions documented in this report. The data presented in this report (Attachments B, C, and D) were verified and validated relative to DOE quality requirements, applicable EPA guidance, and original project DQOs.

In summary, the Verification and Validation (V&V) process corroborates that the following elements of the characterization process are adequate:

- ◆ the *number* of samples and surveys;
- ◆ the *types* of samples and surveys;
- ◆ the sampling/survey process as implemented "in the field"; and
- ◆ the laboratory analytical process, relative to accuracy and precision considerations.

Details of the DQA are presented in Attachment E. The DQA Checklists are provided in the individual survey unit packages (located in the Building 771 Characterization Files).

The Minimum Detectable Activity (MDA) for each PDS instrument was determined *a priori* based on typical parameters (background, efficiency, and count time). A list of radiological field instrumentation and associated sensitivities is presented in Table 1.

Table 1  
PDS Radiological Field Instrumentation and Minimum Detectable Activities

Model	Measurement Type	MDA (dpm/100 cm <sup>2</sup> )
NE Electra DP6	TSA	48
Eberline SAC-4	Removable (Smears)	10
NE Electra AP6	Scans	300

## 7 DECOMMISSIONING WASTE TYPES

The demolition and disposal of Building 771/774 Exterior will generate a variety of wastes. Concrete can be used as backfill onsite in accordance with the RFCA RSOP for Recycling Concrete.

## 8 FACILITY CLASSIFICATION AND CONCLUSIONS

Based on the analysis of radiological, chemical and physical hazards, the Building 771/774 Exterior is classified as an RFCA Type 3 facility pursuant to the RFETS Decommissioning Program Plan (DPP; K-H, 1999). Based upon the results of this PDSR, the 771/774 Exterior meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan and is ready for demolition. The PDS for the Building 771/774 Exterior was performed in accordance with the DDCP and PDSP, all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria.

A facility walkdown and historical review indicates that no RCRA/CERCLA constituents exist on the B771/774 Area surfaces (refer to Attachment F, Historical Review).

Radiological contamination in excess of the PDSP Table 7-1 limits was not detected in the Building 771/774 Exterior.

Based upon this PDSR, the Building 771/774 Exterior can be demolished and the waste managed as sanitary, and the concrete can be used for backfill on-site per the RFCA RSOP for Recycling Concrete. To ensure that the facility remains free of contamination and that PDS data remain valid, Level 2 isolation controls have been established.

## 9 REFERENCES

*B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0.

DOE/RFFO, CDPHE, EPA, 1996. *Rocky Flats Cleanup Agreement (RFCA)*, July 19, 1996.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*

DOE Order 414.1A, *Quality Assurance*

EPA, 1994. *The Data Quality Objective Process*, EPA QA/G-4.

K-H, 1999. *Decommissioning Program Plan*, June 21, 1999.

MAN-131-QAPM, *Kaiser-Hill Team Quality Assurance Program*, Rev. 1, November 1, 2001.

MAN-076-FDPM, *Facility Disposition Program Manual*, Rev. 3, January 1, 2002.

MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol*, Rev. 4, July 15, 2002.

MAN-127-PDSP, *Pre-Demolition Survey Plan for D&D Facilities*, Rev. 1, July 15, 2002.

MARSSIM - *Multi-Agency Radiation Survey and Site Investigation Manual* (NUREG-1575, EPA 402-R-97-016).

PRO-475-RSP-16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure*, Rev. 1, May 22, 2001.

PRO-476-RSP-16.02, *Pre-Demolition (Final Status) Radiological Surveys of Surfaces and Structures*, Rev. 2, March 10, 2003.

PRO-477-RSP-16.03, *Radiological Samples of Building Media*, Rev. 1, May 22, 2001.

PRO-478-RSP-16.04, *Radiological Survey/Sample Data Analysis for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-479-RSP-16.05, *Radiological Survey/Sample Quality Control for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-563-ACPR, *Asbestos Characterization Procedure*, Revision 0, August 24, 1999.

PRO-536-BCPR, *Beryllium Characterization Procedure*, Revision 0, August 24, 1999.

*RFETS, Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition.*

*RFETS, Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal.*

*RFETS, RFCA RSOP for Recycling Concrete*, September 28, 1999

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